УДК 339.924

Novoselova Valeriia D.,
Student,
Department of International Economics and Management,
Graduate School of Economics and Management,
Ural Federal University named after the first President of Russia B. N. Yeltsin",
Yekaterinburg, Russian Federation

EXTERNAL EFFECTS FROM PARTICIPATION IN GLOBAL VALUE CHAINS FOR RUSSIAN MANUFACTURING COMPANIES

Abstract:
Recent research has shown that countries can benefit from participating in GVCs, but empirically little is known about the economic importance of value chains. I use the RUSLANA database to illustrate the impact of external effects from GVC participation on the performance of Russian manufacturing firms.

Keywords:
global value chains, input-output linkages, trade, benefits from participation in GVCs

More and more firms are now organizing production on a global scale and prefer to supply components or services to manufacturers from another countries. They are able to do this due to global value chains participation, which provides access to more competitive prices, greater diversity and economies of scale. Fragmented manufacturing at the international level allows emerging economies to join existing supply chains, rather than build them. As the complexity of goods increases, joining the supply chain removes the need to gain comparative advantage across a wide range of manufacturing stages.

A common feature of both the conceptual framework and the empirical indicators described so far is that they advocate analysis at the country level or at the country and industry level. However, it is known that firm-level analysis provides more accurate and specific results. The novelty of my model and research is that I overcame several longstanding problems in the literature and created a model based on the participation of specific manufacturing firms in GVCs.

The purpose of my research is to assess empirically the external effects of participation in global value chains on the productivity of Russian companies in manufacturing.

The formation of GCSs began in the 70s of the XX century, when the interdependence of developed economies increased. [1] Professor M. Porter in his book «Competitive Advantage» broadly defined global value chains (GVCs) as a phenomenon in which the production of an end product is divided into stages according to the activities and tasks performed in different countries.

The two measures of GVC participation are:

- backward linkages – the share of foreign value-added in total exports of a certain country;
- forward linkages – the domestic value-added embodied in intermediate exports that are further re-exported to third countries.

There are many opinions in the literature on how participation in GVCs can stimulate productivity growth at the country, sector and enterprise level. In general, GVCs allow resources to flow to their most productive use, not only across countries and sectors, but also within sectors across stages of production. As a result, GVCs magnify the growth, employment, and distributional impacts of standard trade. [2]

Many researchers emphasize that participation in GVC may have negative results. [3, 4] The growth of GVCs certainly carries some risks, such as potential disruption to social cohesion, undermining the well-being of the workforce and environmental degradation. There also is a risk of

widening the economic gap between countries as a result of the division of labor. For example, countries participating in GVCs may find themselves locked out in low value-added activities in the long run.

However, to my mind, despite the risks of participation, GVCs represent an attractive way of industrialization for developing countries. Due to the international fragmentation of production, countries no longer need to create finished products or value chains. Instead, they can participate in a specific stage of production in the value chain that matches their level of production capability.

Providing resources to exporting firms gives countries the prospect of rapidly achieving economies of scale. Participation in GVCs makes it possible to transfer knowledge and the latest technology between firms and countries. Such interchange can lead to accelerated industrial modernization and, in turn, to improve product quality and stimulate participation in production activities with higher added value.

Russia's participation in GVCs has grown mainly due to forward participation closely related to its specialization in the export of natural resources, which are intensively used as intermediate resources in the export of Russia's trading partners. At the same time, although participation itself is largely beneficial for many countries, it may not ensure net gains created by trade. It is a challenge for any country, and Russia is not an exception, to focus on policy measures that could increase benefits from value chain participation. Economists agree that higher participation in GVCs doesn't automatically lead to higher gains from this participation.

The implications of participation in GVCs become significantly richer when adopting a firm-level approach to GVCs. [5] This emphasis makes it clear that participation in GVCs increases total income, in part due to increased firm productivity. This is because there is a direct effect of the fact that the use of foreign value-added in production is due to the fact that firms can obtain resources from abroad at lower prices than from domestic suppliers. On the other hand, this cost reduction, coupled with exports associated with GVCs, tends to increase the scale of activities of firms participating in GVCs. In addition, as discussed earlier, the vast literature mainly presents a country and industry approach to GVCs, while much clearer conclusions can be drawn at the firm level.

As part of the general research topic of the impact of external effects from participation in GVCs on productivity in the manufacturing sector, I formulate the following hypotheses.

H1: External effects from "forward" and "backward participation in GVCs are stronger for a) larger firms in the industry, b) more efficient firms.

In formulating this hypothesis, I am assuming that, as discussed earlier, large firms with greater manufacturing capacity, better technology, and a more skilled workforce should benefit most from participating in GVCs. Large firms participating in GVCs (especially in manufacturing) tend to be larger and more capital intensive than other types of enterprises. [6] In addition, more efficient firms produce more with technological advantage. For them, participation in the GVC will be beneficial as they will be at the top of the chain.

H2: External effects from "forward" and "backward GVC participation are stronger for firms in knowledge-intensive industries.

Knowledge-intensive industries have high barriers to entry. Accordingly, the income from such activities will be higher due to the high demand for the final product. And if the company participates in the GVC, it will be able to concentrate on a narrower production area, invest only in it and develop rapidly.

Based on the above analysis of the existing literature, I formulate an econometric model of the impact of external effects from participation in GVC on productivity in the following form. The dependent variable in the model is the Total Factor Productivity (TFP) of firm i in year t in relation to the previous year:

$$TFP_{it} = \alpha_1 Age_i + \alpha_2 State_i + \alpha_3 Region_i + \alpha_4 Size_i + \alpha_5 Ind_i + \alpha_6 GVC_{it} + \varepsilon_{it} \quad (1)$$

Where:

TFP_{it} – Total Factor Productivity (Levinsohn, Petrin, 2003);

Age_i – age of the company;
$State_i$ – state ownership;
$Region_i$ – region;
$Size_i$ – number of employees;
Ind_i – industry;
GVC_{it} – participation in global value chains;
ε_{it} – regression error.

As an object of research, I chose the manufacturing sector of the Russian economy. The data sources for the study are the RUSLANA database for 2010-2019, as well as data on the participation of Russian industries in the GVC UIVE-GVC Indicators 2005-2014 for Russian companies, the field of activity of which belongs to the category "Manufacturing" according to the OKVED classifier. The total number of companies in the database is 123 495, companies are located in 82 Russian regions.

The database used has a panel structure. Regression estimates are given taking into account the correction for heteroscedasticity, since the Breusch – Pagan test revealed its presence in the model. The absence of multicollinearity in the model was confirmed by carrying out the corresponding test, as well as by analyzing the regressors for pair correlation.

The explanatory variables are:

- GVC_Pat_f = export VA of intermediate production / producer country-sector VA;
- GVC_Pat_b = FGY_GVC/ FGY – foreign VA in intermediate imports / country-sector VA in final goods

To test the above hypothesis 1.a, I split the database by company size from S smallest to XXL largest. As can be seen from Picture 1, external effects from forward participation in GVCs increase with firm size. But when it comes to backward engagement, there is no trend. According to my expectations, large firms benefit more from participating in forward GVC.

Variable	Pat_f_S	Pat_f_M	Pat_f_L	Pat_f_XL	Pat_f_XXL
GVC_Pat_b	2.533***	2.343*	5.729***	1.197	1.197
GVC_Pat_f	1.126**	1.927**	3.876***	3.604***	3.604***
N	55428	8310	4914	2858	2858
r2_o	0.092	0.177	0.190	0.285	0.285

legend: * p<.1; ** p <.05; *** p<.01

Picture 1 – The division of companies in relation to their size.

On Picture 2 you can see the separation of companies by levels of efficiency (productivity). Hypothesis 1.b was confirmed for firms with an average level of productivity (within 0.7-1.3) of the industry average on both forward and backward linkages.

Variable	leastEFF	medEFF	mostEFF
GVC_Pat_b	1.841***	2.154***	1.404
GVC_Pat_f	0.254	1.705***	-1.086
N	16901	42301	12308
r2_o	0.178	0.304	0.144

legend: * p<.1; ** p<.05; *** p<.01

Picture 2 – Division of companies based on efficiency.

Picture 3 shows the impact of external effects from participation in GVCs on firms differentiated by knowledge intensity. Hypothesis 2 was confirmed only for forward linkages; there

is no trend for backward. This can be explained by the fact that the company does not use an imported intermediate product, but exports it for revision.

Variable	H_Tech	M_Tech	L_Tech
GVC_Pat_b	-0.163	7.039***	-0.195
GVC_Pat_f	1.041	1.414	1.761***
N	15832	22103	33575
r2_o	0.125	0.115	0.138

legend: * p<.1; ** p<.05; *** p<.01

Picture 3 – Division of companies based on the principle of knowledge intensity.

Thus, in the process of work, I studied the main literature on the topic, considered several points of view and identified for myself the problems that need to be solved, and also investigated the external effects of participation in global value chains on various options for splitting firms in the model and received adequate results. consistent with my hypotheses.

The main conclusion is that participation in GVCs is generally beneficial for Russian manufacturing companies. However, the analysis also showed that in order to successfully integrate into GVCs, Russian companies must develop individual entry strategies based on their financial and market performance, since external effects from participation vary widely depending on these factors.

References:

1. Epov, I. S. (2018). History of global value chains origin. Interactive Science, 8 (30), 49-53. https://doi.org/10.21661/r-472977
2. Antràs, P. (2020). Conceptual Aspects of Global Value Chains. In National Bureau of Economic Research. https://doi.org/10.3386/w26539
3. Rodrik, D. (2018). New Technologies, Global Value Chains, And Developing Economies. National Bureau Of Economic Research, 25164.
4. Goger, Annelies, et al., (2014). Capturing the Gains in Africa: Making the most of global value chain participation, Duke Center on Globalization, Governance, and Competitiveness.
5. Raei, F., Ignatenko, A., & Mircheva, B. (2019). Global Value Chains: What are the Benefits and Why Do Countries Participate? International Monetary Fund, 19(18), 1. https://doi.org/10.5089/9781484392928.001
6. Bernard, Andrew B., et al., (2007). Firms in International Trade, Journal of Economic Perspectives, 21: 3, 105-130.